Go to wikispaces and click on Chapt.3 PPT

Start on slide 35 – open your books and follow along with the book as you fill in the notes.

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chemistry H – October 5th, 2011

STOICHIOMETRY: QUANTITATIVE RELATIONS IN CHEMICAL REACTIONS

Stoichiometry – the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Relationship between mass and moles.

3.6 MOLAR INTERPRETATION OF A CHEMICAL EQUATION

N2 + 3H2 = 2NH3

How much hydrogen is required to give a particular quantity of ammonia?

One N2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Three H2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Two NH3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write pg. 81

•Suppose you ask how many grams of nitrogen will react with 6.06g (3 x 2.02 g) of hydrogen.

The answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.7 AMOUNTS OF SUBSTANCES IN A CHEMICAL REACTION

-Balanced chemical equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-The coefficients can be given a molar interpretation and can be used to calculate the moles of product obtained from any given moles of reactant.

Ex. You have a mixture of H2 and N2 and 4.8 mol H2 in this mixture reacts with N2 to produce NH3.

How many moles of NH3 can you produce from this quantity of H2?

Multiplying any quantity of H2 by this conversion factor converts that quantity of H2 to the quantity of NH3 as specified by the balanced chemical equation.

To calculate the quantity of NH3 produced from 4.8 mol H2, you write 4.8 mol H2 and multiply this by:

Solution:

Calculate the moles of reactant needed to obtain the specified moles of product.

Setting up the conversion factor: refer to balanced equation and place \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the bottom and the quantity you are converting to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3 mol H2 / 2 mol NH3

Converts from mol NH3 to mol H2

Practice problem: how much hydrogen is needed to yield 907 kg of ammonia? The balanced chemical equation directly relates moles of substances, not masses.

\*write conversion

Solution:

This is the step by step process to convert grams of reactant to grams of product.

Slide 45 (write it here)

Write down the process and solution of example 3.12

3.8 LIMITING REACTANT; THEORETICAL AND PERCENTAGE YIELDS

-Limiting reactant (reagent) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction goes to completion.

-A reactant that is not completely consumed is often referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-Once one of the reactants is used up, the reaction stops.

Analogy: your plant has in stock 300 steering wheels and 900 tires, plus an excess of every other needed component. How many autos can you assemble from this stock?

One way to solve this problem is to calculate the number of autos that you could assemble from each component. 300 steering wheels = 300 autos, 900 tires = 225 autos

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are the limiting reactant.

Now consider a chemical reaction, the burning of hydrogen in oxygen.

2H2 + O2 = 2H2O

find the limiting reactant using moles. (look in book if you don’t’ know how to do this)

H must be the limiting reactant. O is the excess reactant.

Ex. 3.13

Write the step by step process below.

Ex. 3.14

Write the step by step process below.

Theoretical yield: maximum amount of product that can be obtained by a reaction from given amounts of reactants.

Actual yield of a product may be much less for several possible reasons.

1. Some product \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. There may be other competing reactions that occur \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with the reactant.

3. Many reactions appear to stop before they reach completion; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Percentage yield of product is the actual yield expressed as a percentage of the the theoretical yield.

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Ask for the practice problems. I will collect this worksheet next class. The next quiz will be on Tuesday, this is the last assessment grade before the end of the quarter. It will be worth 50 points and will cover all of chapter 3.